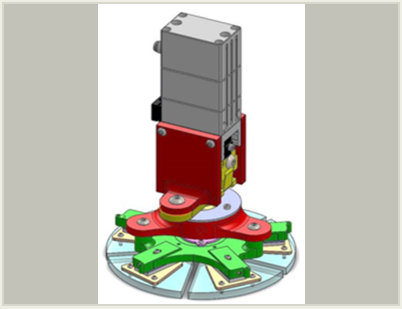
Industrial Electrostatic-Gecko Gripper, Phase II

Completed Technology Project (2016 - 2019)

Project Introduction

Perception Robotics is developing an innovative product, the Electrostatic Gecko Gripper? (ESG Gripper), for the industrial automation market. This unique gripping solution overcomes the shortcomings of vacuum grippers by eliminating the need for a compressed air system and offering more rapid actuation, thus achieving significant cost savings and throughput improvements in customers? manufacturing processes. The ESG gripper couples an electrostatic Perception Robotics is developing an innovative product, the ?Electrostatic Gecko Gripper(ESG Gripper), for the industrial automation market. This unique gripping solution overcomes the shortcomings of vacuum grippers by eliminating the need for a compressed air system and offering more rapid actuation, thus achieving significant cost savings and throughput improvements in customers manufacturing processes. The ESG gripper couples an electrostatic adhesive with an adhesive element inspired by gecko feet. When the electrostatic and gecko adhesives work together, a positive feedback cycle is created that, depending on surface type, can be greater than the sum of its parts. As the gecko adhesive engages, it brings the electrostatic adhesive closer to the surface, thus increasing its adhesive force; in turn, the electrostatic adhesive helps engage more of the fibrillar stalks of the gecko adhesive. Previous experimental results have shown that the combination adhesive technology can provide up to 5.1x greater adhesion that an electrostatic or gecko-like adhesive alone. This body of work will result in two hardware and software deliverables for transfer to NASA: 1.A piezoelectrically driven rig to automate and normalize the post-treatment process for improving the gecko adhesive (Q3CY1) 2.An improved industrial electrostatic gecko gripper with sensing and control software for an industrial robot. This factory-ready unit will position us well for production of a flight-ready version in Phase III. (Q4CY2)



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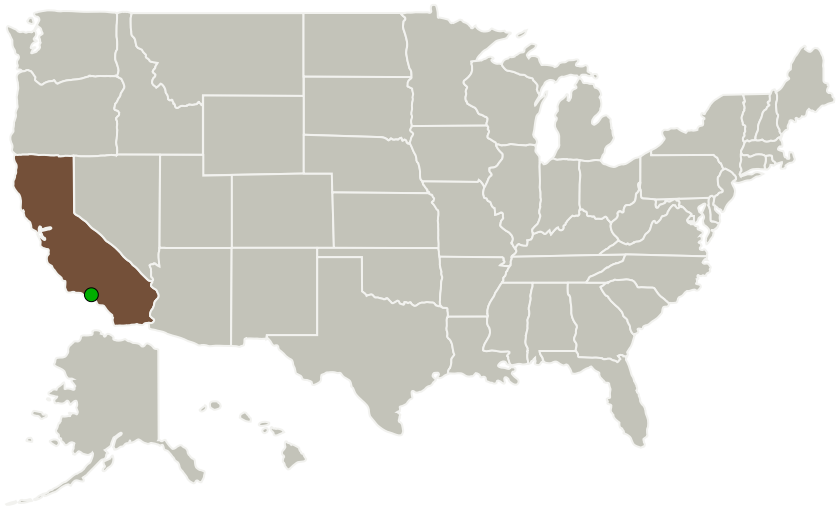
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Somatis Sensor Solutions	Lead Organization	Industry Historically Underutilized Business Zones (HUBZones)	Los Angeles, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

April 2016: Project Start

August 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139773)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Somatis Sensor Solutions

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Nicholas Wettels

Co-Investigator:

Nicholas Wettels

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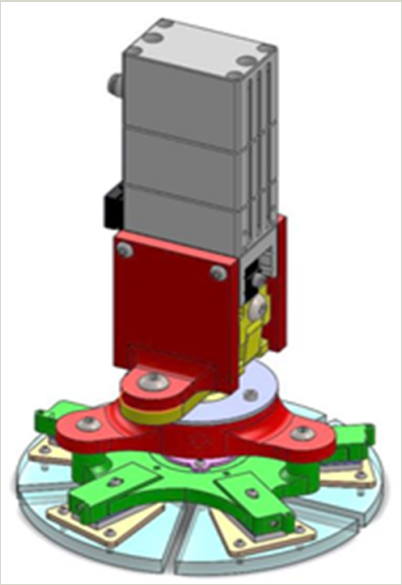
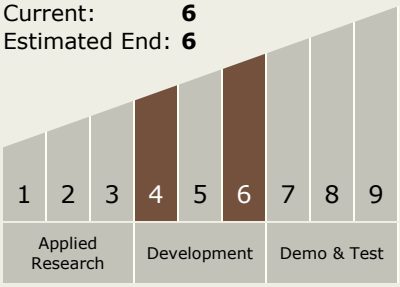
Images



Briefing Chart Image
Industrial Electrostatic-Gecko Gripper, Phase II
(https://techport.nasa.gov/image/126834)

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.2 Above-Surface Mobility

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System